AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended): A method comprising:

monitoring at least one physiological parameter of a patient via a medical device that delivers a therapy to the patient, wherein the therapy comprises electrical stimulation;

determining a value of a metric that is indicative of sleep quality based on the at least one physiological parameter;

comparing the sleep quality metric value to a threshold value; and

adjusting a therapy parameter within a specified range based on the comparison, wherein adjusting the therapy parameter comprises adjusting at least one of a pulse amplitude, pulse rate, pulse width or duty cycle of the stimulation.

Claim 2 (Previously Presented): The method of claim 1, wherein monitoring at least one physiological parameter comprises monitoring at least one of activity level, posture, heart rate, respiration rate, respiratory volume, or core temperature.

Claim 3 (Previously Presented): The method of claim 1, wherein monitoring at least one physiological parameter comprises monitoring at least one of blood pressure, blood oxygen saturation, partial pressure of oxygen within blood, partial pressure of oxygen within cerebrospinal fluid, muscular activity, arterial blood flow, melatonin level within a bodily fluid, or galvanic skin response.

Claim 4 (Original): The method of claim 1, wherein the sleep quality metric comprises sleep efficiency, and determining the value of the sleep quality metric comprises:

identifying when the patient is attempting to sleep;

identifying when the patient is asleep; and

determining a percentage of time that the patient is asleep while the patient is attempting to sleep.

Claim 5 (Original): The method of claim 1, wherein the sleep quality metric comprises sleep latency, and determining the value of the sleep quality metric comprises:

identifying a first time when the patient begins attempting to sleep;

identifying a second time when the patient falls asleep; and

determining an amount of time between the first and second times.

Claim 6 (Original): The method of claim 1, wherein determining the value of the sleep quality metric comprises:

identifying when the patient is asleep; and

determining an amount of time that the patient is asleep during a period.

Claim 7 (Previously Presented): The method of claim 1, wherein determining the value of the sleep quality metric comprises:

identifying when the patient is asleep; and

identifying at least one of a number of arousal events or a number of apnea events during a period of sleep.

Claim 8 (Original): The method of claim 1, wherein determining the value of the sleep quality metric comprises:

identifying when the patient is within a sleep state; and

determining an amount of time that the patient was within the sleep state.

Claim 9 (Previously Presented): The method of claim 8, wherein the sleep state comprises at least one of an S3 sleep state or an S4 sleep state.

Claim 10 (Original): The method of claim 1, wherein determining a value of a metric that is indicative of sleep quality comprises:

determining a value of each of a plurality of sleep quality metrics; and

determining a value of an overall sleep quality metric based on the plurality of sleep quality metric values.

Claim 11 (Original): The method of claim 10, wherein determining a value of an overall sleep quality metric comprises applying a weighting factor to at least one of the plurality of sleep quality metric values.

Claim 12 (Previously Presented): The method of claim 1, wherein the sleep quality metric value comprises one of a mean or a median sleep quality metric value.

Claims 13 and 14 (Cancelled).

Claim 15 (Currently Amended): The method of claim ~~14~~1, wherein the therapy comprises neurostimulation.

Claim 16 (Previously Presented): The method of claim 1, wherein the therapy comprises a therapeutic agent, and adjusting the therapy parameter comprises adjusting at least one of a dosage or an infusion rate for the therapeutic agent.

Claims 17-21 (Cancelled).

Claim 22 (Original): The method of claim 1, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 23 (Original): The method of claim 1, wherein the medical device comprises an implantable medical device.

Claim 24 (Currently Amended): A medical device comprising:

a therapy module to deliver a therapy to a patient, wherein the therapy comprises electrical stimulation;

a memory to store a specified range for a therapy parameter; and

a processor configured to monitor at least one physiological parameter of a patient based on at least one signal received from at least one sensor, determine a value of a metric that is indicative of sleep quality based on the at least one physiological parameter, compare the sleep quality metric value to a threshold value, and adjust the therapy parameter within the specified range based on the comparison, wherein the processor adjusts at least one of a pulse amplitude, pulse rate, pulse width or duty cycle of the stimulation based on the comparison.

Claim 25 (Previously Presented): The medical device of claim 24, wherein the processor monitors at least one of activity level, posture, heart rate, respiration rate, respiratory volume, or core temperature.

Claim 26 (Previously Presented): The medical device of claim 24, wherein the processor monitors at least one of blood pressure, blood oxygen saturation, partial pressure of oxygen within blood, partial pressure of oxygen within cerebrospinal fluid, muscular activity, arterial blood flow, melatonin level within a bodily fluid, or galvanic skin response.

Claim 27 (Original): The medical device of claim 24, wherein the sleep quality metric comprises sleep efficiency, and the processor identifies when the patient is attempting to sleep, identifies when the patient is asleep, and determines a percentage of time that the patient is asleep while the patient is attempting to sleep as the value of the sleep quality metric.

Claim 28 (Original): The medical device of claim 24, wherein the sleep quality metric comprises sleep latency, and the processor identifies a first time when the patient begins

attempting to sleep, identifies a second time when the patient falls asleep, and determines an amount of time between the first and second times as the value of the sleep quality metric.

Claim 29 (Original): The medical device of claim 24, wherein the processor identifies when the patient is asleep, and determines an amount of time that the patient is asleep during a period as the value of the sleep quality metric.

Claim 30 (Previously Presented): The medical device of claim 24, wherein the processor identifies when the patient is asleep, and identifies at least one of a number of arousal events or a number of apnea events during a period of sleep as the value of the sleep quality metric.

Claim 31 (Original): The medical device of claim 24, wherein the processor identifies when the patient is within a sleep state, and determines an amount of time that the patient was within the sleep state as the value of the sleep quality metric.

Claim 32 (Previously Presented):The medical device of claim 31, wherein the sleep state comprises at least one of an S3 sleep state or an S4 sleep state.

Claim 33 (Original): The medical device of claim 24, wherein the processor determines a value of each of a plurality of sleep quality metrics, and determines a value of an overall sleep quality metric based on the plurality of sleep quality metric values.

Claim 34 (Original): The medical device of claim 33, wherein the processor applies a weighting factor to at least one of the plurality of sleep quality metric values to determine the value of the overall sleep quality metric.

Claim 35 (Previously Presented): The medical device of claim 24, wherein the sleep quality metric value comprises one of a mean or a median sleep quality metric value.

Claims 36 and 37 (Cancelled).

Claim 38 (Previously Presented): The medical device of claim 24, wherein the therapy module delivers a therapeutic agent, and the processor adjusts at least one of a dosage or an infusion rate for the therapeutic agent based on the comparison.

Claims 39-43 (Cancelled).

Claim 44 (Original): The medical device of claim 24, wherein the medical device comprises an implantable medical device.

Claim 45 (Previously Presented): The medical device of claim 44, wherein the implantable medical device comprises at least one of an implantable neurostimulator or an implantable pump.

Claim 46 (Original): The medical device of claim 24, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 47 (Previously Presented): A computer-readable medium comprising instructions that cause a programmable processor to:

monitor at least one physiological parameter of a patient via a medical device that delivers a therapy to the patient;

determine a plurality of values of a metric that is indicative of sleep quality over time based on the at least one physiological parameter;

associate each of the determined values of the sleep quality metric with a current therapy parameter set;

for each of the therapy parameter sets, determine a representative value of the sleep quality metric based on the values of the sleep quality metric associated with the therapy parameter set; and

automatically select one of the therapy parameter sets for delivery of the therapy based on the representative sleep quality metric values for the therapy parameter sets.

Claims 48-49 (Cancelled).

Claim 50 (Previously Presented): A method comprising:

monitoring at least one physiological parameter of a patient via a medical device that delivers a therapy to the patient;

determining a value of a metric that is indicative of sleep quality based on the at least one physiological parameter;

comparing the sleep quality metric value to a threshold value; and

adjusting the therapy in an amount proportional to at least one of a difference or a ratio between the sleep quality metric value and the threshold value.

Claim 51 (Previously Presented): The method of claim 50, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 52 (Previously Presented): The method of claim 50, wherein the medical device comprises at least one of an implantable neurostimulator or an implantable pump.

Claim 53 (Previously Presented): The method of claim 50, wherein the sleep quality metric comprises at least one of sleep latency or sleep efficiency.

Claim 54 (Previously Presented): A method comprising:

monitoring at least one physiological parameter of a patient via a medical device that delivers a therapy to the patient;

determining a value of a metric that is indicative of sleep quality based on the at least one physiological parameter;

comparing the sleep quality metric value to a threshold value; and

adjusting the therapy based on the comparison,

wherein adjusting the therapy comprises increasing the intensity of the therapy at a first rate and decreasing the intensity of the therapy at a second rate.

Claim 55 (Previously Presented): The method of claim 54, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 56 (Previously Presented): The method of claim 54, wherein the medical device comprises at least one of an implantable neurostimulator or an implantable pump.

Claim 57 (Previously Presented): The method of claim 54, wherein the sleep quality metric comprises at least one of sleep latency or sleep efficiency.

Claim 58 (Previously Presented): A method comprising:

monitoring at least one physiological parameter of a patient via a medical device that delivers a therapy to the patient;

determining a plurality of values of a metric that is indicative of sleep quality over time based on the at least one physiological parameter;

associating each of the determined values of the sleep quality metric with a current therapy parameter set;

for each of a plurality of therapy parameter sets, determining a representative value of the sleep quality metric based on the values of the sleep quality metric associated with the therapy parameter set; and

automatically selecting one of the therapy parameter sets for delivery of the therapy based on the representative sleep quality metric values for the therapy parameter sets.

Claim 59 (Previously Presented):The method of claim 58, wherein the representative value for each of the therapy parameter sets comprises one of a mean value or a median value.

Claim 60 (Previously Presented): The method of claim 58, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 61 (Previously Presented): The method of claim 58, wherein the medical device comprises at least one of an implantable neurostimulator or an implantable pump.

Claim 62 (Previously Presented): The method of claim 58, wherein the sleep quality metric comprises at least one of sleep latency or sleep efficiency.

Claim 63 (Previously Presented): A medical device comprising:

a therapy module to deliver a therapy to a patient; and

a processor to monitor at least one physiological parameter of a patient based on at least one signal received from at least one sensor, determine a value of a metric that is indicative of sleep quality based on the at least one physiological parameter, compare the sleep quality metric value to a threshold value, and adjust the therapy in an amount proportional to at least one of a difference or a ratio between the sleep quality metric value and the threshold value.

Claim 64 (Previously Presented): The medical device of claim 63, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 65 (Previously Presented): The medical device of claim 63, wherein the medical device comprises at least one of an implantable neurostimulator or an implantable pump.

Claim 66 (Previously Presented): The medical device of claim 63, wherein the sleep quality metric comprises at least one of sleep latency or sleep efficiency.

Claim 67 (Previously Presented): A medical device comprising:

a therapy module to deliver a therapy to a patient; and

a processor to monitor at least one physiological parameter of a patient based on at least one signal received from at least one sensor, determine a value of a metric that is indicative of sleep quality based on the at least one physiological parameter, compare the sleep quality metric value to a threshold value, and adjust the therapy based on the comparison,

wherein the processor increases the intensity of the therapy at a first rate and decreases the intensity of the therapy at a second rate.

Claim 68 (Previously Presented): The medical device of claim 67, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 69 (Previously Presented): The medical device of claim 67, wherein the medical device comprises at least one of an implantable neurostimulator or an implantable pump.

Claim 70 (Previously Presented): The medical device of claim 67, wherein the sleep quality metric comprises at least one of sleep latency or sleep efficiency.

Claim 71 (Previously Presented): A medical device comprising:

a therapy module to deliver a therapy to a patient;

a memory to store information identifying a plurality of therapy parameter sets; and

a processor to monitor at least one physiological parameter of a patient based on at least one signal received from at least one sensor, determine a plurality of values of a metric that is indicative of sleep quality over time based on the at least one physiological parameter, associate each of the determined values of the sleep quality metric with a current one of the therapy parameter sets, for each of the therapy parameter sets, determine a representative value of the sleep quality metric based on the values of the sleep quality metric associated with the therapy parameter set, store the representative value of the sleep quality metric in association with the therapy parameter set within the memory, and automatically select one of the therapy parameter sets for delivery of the therapy based on the representative sleep quality metric values for the therapy parameter sets.

Claim 72 (Previously Presented):The medical device of claim 71, wherein the representative value for each therapy parameter set comprises one of a mean value or a median value.

Claim 73 (Previously Presented): The medical device of claim 71, wherein the medical device delivers the therapy to the patient to treat chronic pain.

Claim 74 (Previously Presented): The medical device of claim 71, wherein the medical device comprises at least one of an implantable neurostimulator or an implantable pump.

Claim 75 (Previously Presented): The medical device of claim 71, wherein the sleep quality metric comprises at least one of sleep latency or sleep efficiency.

Claims 76 and 77 (Cancelled).

Claim 78 (New): A method comprising:

monitoring at least one physiological parameter of a patient via a medical device that delivers a therapy to the patient, wherein the therapy comprises a therapeutic agent;

determining a value of a metric that is indicative of sleep quality based on the at least one physiological parameter;

comparing the sleep quality metric value to a threshold value; and

adjusting a therapy parameter within a specified range based on the comparison, wherein adjusting the therapy parameter comprises adjusting at least one of a dosage or an infusion rate for the therapeutic agent.

Claim 79 (New): A medical device comprising:

a therapy module to deliver a therapy to a patient, wherein the therapy module delivers a therapeutic agent;

a memory to store a specified range for a therapy parameter; and

a processor configured to monitor at least one physiological parameter of a patient based on at least one signal received from at least one sensor, determine a value of a metric that is indicative of sleep quality based on the at least one physiological parameter, compare the sleep quality metric value to a threshold value, and adjust the therapy parameter within the specified range based on the comparison, wherein processor adjusts at least one of a dosage or an infusion rate for the therapeutic agent based on the comparison.